UCRL-JC-125143 Abs

Beryllium Doped Plasma Polymer Coatings Using Cyclopentadienyl Beryllium Methyl as a Precursor.

R. Brusasco, R. Cook, G. Wilemski, M. Saculla, Lawrence Livermore National Laboratory, Livermore, CA 94550; D. Gaines, University of Wisconsin, Madison, WI 53706.

Fuel capsule and ablator materials containing beryllium are attractive for use in ICF target experiments at the National Ignition Facility. We report the formation of beryllium doped plasma polymer coatings (CHBe) prepared using a novel organoberyllium precursor, cyclopentadienyl beryllium methyl. Coating rates as high as 1.35 $\mu m\ hr^{-1}$ have been obtained. The beryllium-to-carbon ratio, as determined by X-Ray Photoelectron Spectroscopy, varied from 4:1 when the coating rate was very low to 1:7 at the fastest coating rate. The oxidation behavior of this material was studied gravimetrically in dry air. The temporal behavior of the weight gain shows that the beryllium is completely oxidized within 24 hours of exposure. A simple corrosion model was considered for explaining the oxidation behavior but is inadequate to describe the observed behavior. Infrared spectroscopy was used to investigate the structure of the CHBe material. There is no evidence for the formation of beryllium hydride or carbide and the results support the hypothesis that all of the beryllium present in the material exists as metal sites bound into the polymer network.

**This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract No. W-7405-ENG-48.